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Please find below and/or attached an Office communication concerning this application or proceeding.

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/913,643
Filing Date: October 19, 2001
Appellant(s): JOKINEN ET AL.

James C. Lydon
For Appellant

EXAMINER'S ANSWER

MAILED
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This is in response to the appeal brief filed 11/09/2007 appealing from the Office action mailed 02/12/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is deficient. 37 CFR 41.37(c)(1)(v) requires the summary of claimed subject matter to include: (1) a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, referring to the specification by page and line number, and to the drawing, if any, by reference characters and (2) for each independent claim involved in the appeal and for each dependent claim argued separately, every means plus function and step plus function as permitted by 35 U.S.C. 112, sixth paragraph, must be identified and the structure, material, or acts described in the specification as corresponding to each claimed function must be set forth with reference to the specification by page and line number, and to the drawing, if any, by

reference characters. The brief is deficient because independent claim 30 is directed to a biodegradable silica fiber that is produced by spinning silica sol. The solubility rate of the silica in simulated body fluid is 0.2 to 20 wt-%/hour. While independent claim 30 appears to be a product by process claim, the conditions or process steps are not claimed. Independent claim 30 also recites that biodegradation rate, which is a property of the biodegradable silica fiber is adjusted by controlling the starting point of the spinning process by a viscosity from which the silica fiber is spun. The starting viscosity of the silica sol is not claimed/named and how the starting point of the spinning process is controlled is not claimed.

While the specification at page 1, lines 21-27, describe in the background that the main parameters controlling the process are the "functionality of the silica precursors, or the degree of branching of the silica clusters," and page 6, lines 12-20 describe how silica sol is made from specific silica, the involvement of solvents and the temperature at which the solvent and the silica are mixed are not in the claims. While appellant on pages 2 and 3 describe how the silica fibers are made, the process steps, starting viscosity of the sol are not claimed. Independent claim 30 is directed to a biodegradable silica fiber whose solubility in simulated body fluid is 0.2 to 20 wt-%/hour. Claims 31 and 24-29 depend on claim 30.

Claim 31 further places the solubility of the biodegradable fiber at 0.2 to 8.5 wt-%/hour.

Claim 24 is a delivery device that contains the biodegradable fiber of claim 30, with the fiber containing active agent. Claims 25 and 26 further define the biological agent of claim 24. Claim 27 is a pharmaceutical preparation of the delivery device of claim 24. Claim 28 implants, injects or attaches the biodegradable fiber of claim 30 into a human or animal, with the fiber containing biologically active agent. Claim 29 limits claim 28 to a human.

Independent claim 32 is similar to claim 30 except that in claim 32, the biodegradation rate of the fiber is adjusted by controlling the viscosity of the spinning sol with no indication of what point the controlling of the viscosity starts. Thus, just like independent claim 30, independent claim 32 is directed to a biodegradable silica fiber whose solubility in simulated body fluid is 0.2 to 20 wt-%/hour, and claim 33, which is dependent on claim 32 further places the solubility of the biodegradable fiber at 0.2 to 8.5 wt-%/hour.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Ahola, Manja et al. "Dissolvable Oxides For Biological Applications" WO 97/45367,

Dec. 04 1997

196 09 551

GLAUBITT et al.

7-1997

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 24-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahola et al. (WO 97/45367).

Ahola discloses controllably biodegradable silica-xerogel fibers prepared via a sol-gel process (page 3, lines 25 and 26; page 7, line 22; page 10, lines 1, 2, 16, 17, 21-30) by drawing the fibers from silica sol prepared by sol-gel process (page 7, lines 19-22, 26; page 9, lines 27-35); the start of the drawing process was approximately 10 mPas in Example 2.

Ahola clearly discloses preparing silica sol, spinning the fiber from the silica sol and the spinning begins at a determined viscosity of the sol and exemplifies spinning the fiber at a specified viscosity of 10 mPas in Example 2.

In Example 2, the spinning started at viscosity 10 mPas, the fibers were dissolved (page 14, lines 6-8) in simulated body fluid (23 °C and pH of 7.54; 37 °C and pH of 7.40); this section does not disclose the dissolution rate. In lines 18-20 at page 14, Ahola discloses that the fibers

kept at room temperature dissolved "at significant amounts," and that 10-weight% of the room temperature fibers stored in a desiccator dissolved within 4 weeks. Furthermore, in vivo dissolution test conducted on rats by implanting silica fibers showed that the fibers have been integrated into the surrounding connective tissues after two weeks of the implantation (page 14, line 27 to page 15 line 18). Ahola also discloses that the fibers can be used as delivery devices that can be implanted or injected or attached to mucosa of human or animal body to deliver any of the drugs listed on page 6, lines 11-37 (page 4, line 32 to page 6 line 37). The disclosure of the fiber containing drugs read on claims 24-27 and the disclosure that the fiber containing the bioactive agent(s) can be implanted or injected or attached to the mucosa of human or animal reads on claims 28 and 29.

However, Ahola does not disclose the claimed dissolution rate of 0.2 to 20 wt%/h. A complete or near complete dissolution of implanted fiber was observed 2 weeks after implantation. A desiccated fiber dissolved at a rate of 10 wt%/4 weeks. Ahola fails to disclose the mg-amount of the fiber upon which the dissolution was conducted. There is also no demonstration in applicants' specification that the rate of dissolution provides unusual results to the delivery device of the claims. Both the claimed fiber and the fiber of the prior art dissolve and deliver bioactive agents. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to prepare the fiber of Ahola. One having ordinary skill in the art has the technical know how to determine the rate of dissolution of the fiber implanted in the rat. In the absence of factual evidence, the claimed dissolution rate is not patentable over the prior art fiber that dissolves after 2 weeks of implantation.

Claims 24-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over DE 196 09 551, English translation provided by applicants.

The DE reference discloses fibers that are spun from spinnable mass having viscosity of 0.05-50 Pas (50-50,000 mPas) and a preferred viscosity of 0.5 to 2 Pa (500 to 2,000 mPas) (page 7, last 2 lines of the last paragraph; page 8, second full paragraph). In Exemplary embodiment of Example at page 9, second full paragraph the fiber is prepared by spinning the mass at a temperature of -15 C and at a pressure of 10-15 bar (page 9, second full paragraph). The DE reference discloses that the degradation rate of the fibers can be adjusted to the requirements of each purpose of use and that the fibers degrade under condition prevailing in the human organism and specifically dissolve in body-like fluids (second full paragraph of page 3; 4th full paragraph of page 4) and this meets the limitation of simulated body fluid. The DE reference further discloses that the fiber dissolves/degrades at 10-100 nm fiber radius per day and a fiber having a radius of 10 μ m completely dissolves in 50-500 days (4th full paragraph of page 4).

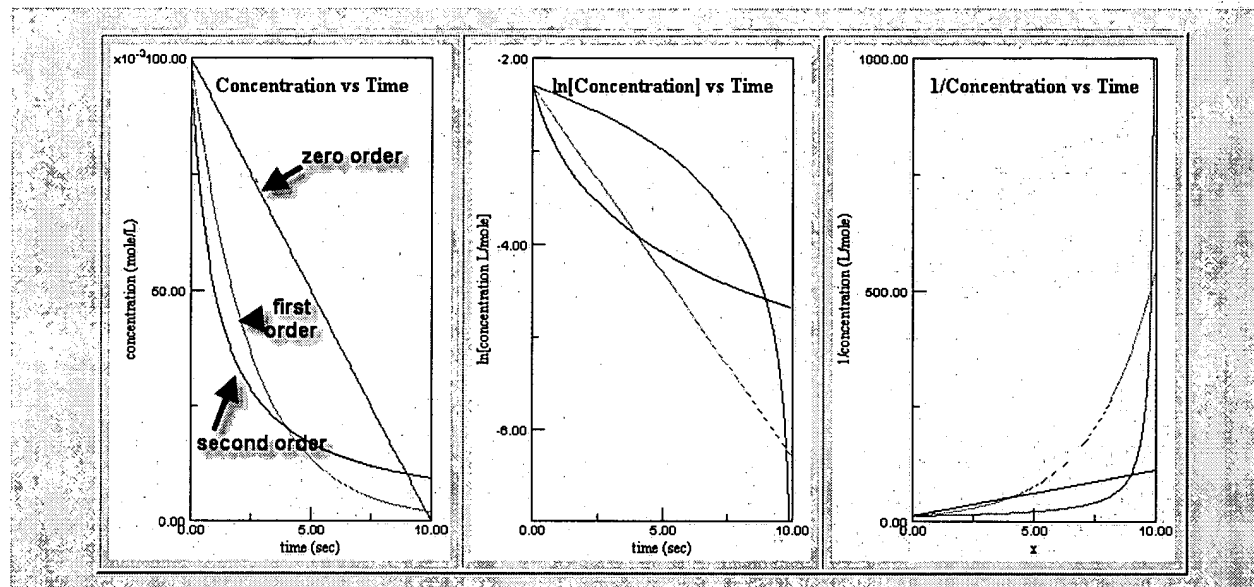
The prior art discusses dissolution in terms of radius of the fiber/day. The claimed invention discusses dissolution in terms of wt%/hr. The radius of fiber/day dissolved can be converted to radius of fiber/hr by the person of ordinary skill or the skilled artisan. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was to prepare silica fiber according to the DE reference. One having ordinary skill in the art would be motivated to prepare the fiber of the DE reference with the expectation that a fiber having a radius of 10 mm would dissolve/degrade within 50-500 days. One having ordinary skill in the art would have the technical know how to determine the degradation/dissolution rate in wt%/day or wt%/h and to adjust the degradation rate according to the desired use as suggested by the DE

reference. In the absence of factual evidence the claimed dissolution rate does not patentably distinguish the fiber of the prior art having dissolution rate in radius/day, which can be converted to radius/h.

(10) Response to Argument

A: In the preamble leading to specific arguments against the rejections, appellant states that a feature of claims 24-33 is that the biodegradable fiber has a solubility rate of 0.20 to 20 wt-%/hour in simulated body fluid such that the fiber will completely dissolve in about 21 days at the slowest rate.

Response: Appellant does not define the rate of dissolution to be first order, second order or zero order dissolution. The specification does not state that the fiber completely dissolves in 21 days at the slowest rate. The rate has to be a zero order rate in order to fit appellants' assertion for a complete dissolution within 21 days. Furthermore, none of the disclosed Figures provided a rate of dissolution that meets or mimic a zero order rate where at a given time, the amount of fiber linearly degrades to nothing having a rate of 0.2 wt-%/hour or any point between 0.2 wt-%/hour and 20 wt-%/hour. For example, the following scenario is typical of zero, first and second order rates shown below: The concentration axis can be taken as the wt-% axis. Thus, without an explicit disclosure that the rate is zero order or that the fiber degrades or dissolves completely within 21 days at the slowest rate of 0.2 wt-%/hour, Appellants assertion that the fiber completely dissolves at 21 days at the slowest rate of dissolution is not persuasive.



Secondly, the solubilities in appellants' specification are determined as a function of sol viscosities as shown in Figures 7-12. Figure 13 captured below looks at solubilities as a function of time for fibers of different viscosities. None of the curves represent zero order rate or constant dissolution rate as shown below:

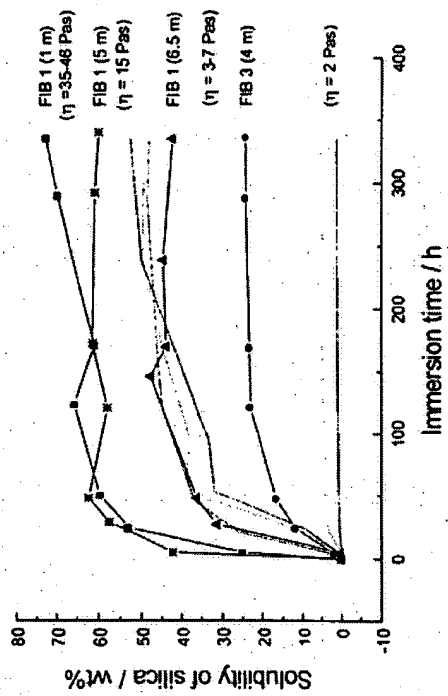
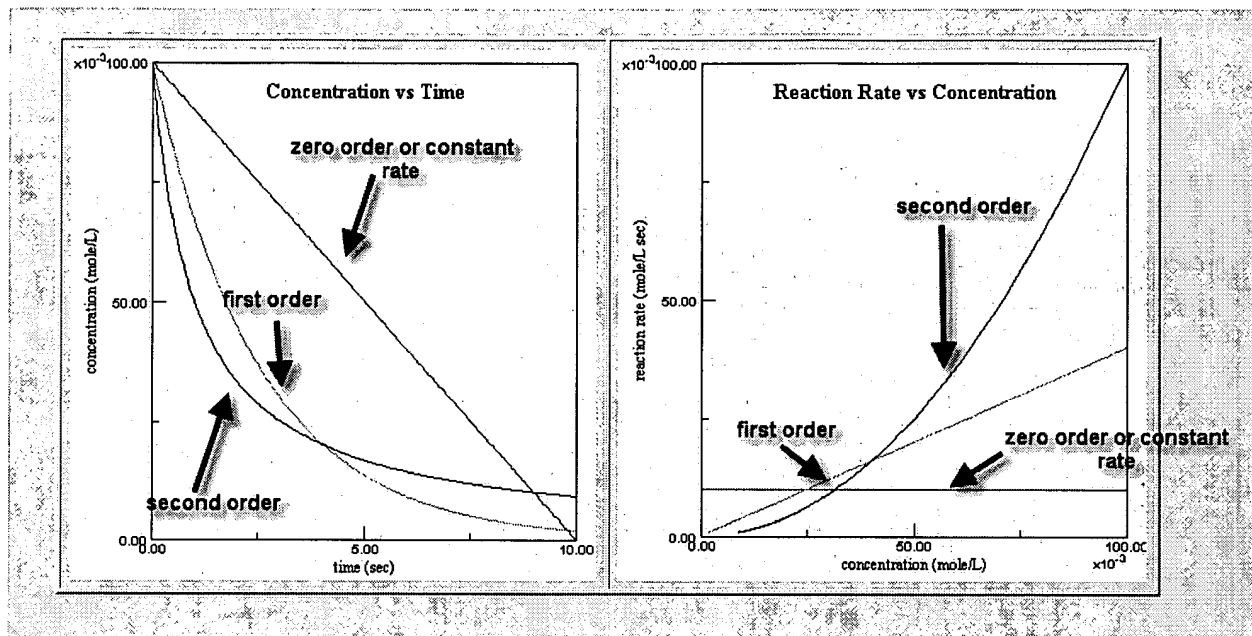


Fig. 13

The above can also be compared with the below:



In all, the arguments are generally related to solubility difference between the prior art silica fiber and the claimed silica fiber, both of which are spun from silica sol. The claims do not say what the temperature of the spinning is, the concentration of the silica in the sol, the starting viscosity of the spinning sol. It does appear from appellants arguments that applicant had not claimed the silica fiber that would have the dissolution rate recited. The rejections are not anticipatory rejections but one of obviousness. Ahola and the DE reference render the claimed fiber obvious.

B) Ahola et al. (WO 97/45367)

Appellant argues that i) Ahola's fiber dissolves at a rate of 0.0148 wt-%/hour, which is significantly lower than appellant's fiber that dissolves at a rate of 0.2 wt-%/hour minimum solubility rate; ii) Ahola reports that almost all the fibers implanted into rats had integrated well into the surrounding connective tissue (page 15, lines 14-17); iii) Appellant says that "solubility

rate of silica fiber is not inherent to the chemical composition of the fiber *per se*” according to the Declaration under 37 CFR 1.132 by Dr. Jokinen. Appellant further says, (see page 8 of the brief at lines 5-7 from the bottom up), “it is true solubility *per se* is an inherent property of a material, but the rate for reaching the solubility limit is not inherent,” so that “the rate of dissolution for two samples of identical material in equal amounts in a dissolution medium such as water or simulated body fluid may be different due to physical property such as pore structure.” Appellant supports the preceding statement by stating that powdered sugar dissolves faster in coffee than sugar cube; also Fig. 8 shows that the solubility of silica fiber in simulated body fluid is not inherent to the fiber *per se* because the solubility rate of fibers prepared from the same recipe and aged for the same time at 2 weeks is shown to be dependent on the viscosity of the spinning sol at the starting point of the spinning process --- “fibers which are spun in the early stages of the spinnability period degrade more slowly in simulated body fluid than fibers spun in the later stages of spinnability.” iv) It is improper for the Patent Office to argue inherency while Ahola expressly discloses a solubility rate of 0.0148 wt-%/hour. v) Inherency may not be established by probabilities or possibilities because, appellant argues that in the present case, the samples of silica fibers prepared from the same recipe were subjected to various post-fiber production processing steps should have all exhibited the same solubility rate and that the Jokinen declaration shows other wise. vi) *in vivo* testing does not inherently disclose the claimed solubility and that Ahola’s statement that “almost all the fibers had integrated well into the surrounding connective tissue” does not mean that the fibers had dissolved. vii) One of ordinary skill in the art has no way of calculating a solubility rate for the silica from the disclosure and as such Ahola cannot inherently disclose or suggest a biodegradable silica fiber

having a solubility rate of 0.2-20 wt-%/hour in simulated body fluid. viii) Example 5 of Ahola does not produce a fiber. ix) no additional factual showing is necessary and the claimed fiber is unobvious over the Ahola reference.

Response:

Regarding i), it is noted that Ahola does not say that the fibers dissolved completely within 4 weeks, only that 10 wt-% dissolved within 4 weeks. There is no other data showing a dissolution rate that is measured or determined to indicate a %/hour or %/week. Appellant's calculation assumes that the rate of dissolution is constant for the fiber so that a calculation can be made to linearly extrapolate to hourly dissolution. However, rates of dissolution can be first order or second order or zero order and Ahola does not indicate the dissolution rate is constant at 10 wt-%/4 weeks; Ahola does not also indicate what weight percent shall have dissolved within the next 4 weeks or 2 weeks or 5 months. Furthermore, appellant does not say that the dissolution rate of 0.2 wt-%/hour is a constant dissolution rate.

Regarding ii) it is noted that Ahola does not disclose the amount of fiber that was implanted into the rat. Further, all the fibers had not integrated into the surrounding tissue within the 2 weeks and Ahola does not teach a dissolution rate. A teaching that almost all the fibers had integrated into the surrounding connective tissue also provides a teaching of fast dissolution even if the dissolution of the fiber may not be a zero order rate.

Regarding iii), appellant may take note that the factors appellant asserts that may affect the rate of dissolution, such as the physical properties of pore size, powdered material vs. cube crystals are structural differences that are not in the appealed claims, the starting viscosity of the spinning sol is another parameter that is not present in the appealed claims. The appealed

product of claim 30 is fiber that is spun from a sol. Ahola's fiber is also spun from a sol so that in that wise the fiber of Ahola would have anticipated the claimed fiber even with a recitation that the dissolution is 0.2-20 wt-%/hour, an inherent property acknowledged by appellant. In one vein, appellant says that solubility is inherent property of a material, in another vein appellant states that solubility of a chemical composition is not inherent and later in the arguments provides scenario that would make the solubilities of two materials or products to not have the same solubilities. In essence, appellant's argument provides reasons as to why appellant's product is different from Ahola's product but these scenarios are not claimed, but those seeming differences that appear to give appellants product a rate of dissolution that may be different from Ahola's has not been claimed. The opinion declaration by Dr. Jokinen is not a factual showing. A sugar cube and powder sugar are not structurally the same, the powder present higher surface area than the cube and the surface area influences dissolution rates. Two sets of silica fiber that have no structural distinction would have the same properties and if one differs from the other, there must be a feature in the one that have not been explicitly disclosed. Five grams of sodium chloride in the same amount of water should and must have the same dissolution rate except where one is a rock and the other powder. The claims do not say that the fibers in the appealed claims are spun at later or early stages of spinnability and even then a factual showing would be needed to show the differences in the solubility rates. Again an opinion declaration would not take the place of factual showing when the fiber of the prior art anticipates the claimed fiber, and absent recitation of parameters that may confer different properties of the claimed fiber, the fiber of the claims would not be patentably distinct from the fiber of the prior art by dissolution rate alone that is not stated at what point that dissolution rate

is taken/determined and what the parameters are that influence dissolution rate. Regarding Fig. 8, the viscosity parameters of the spinning sol is not claimed so that Fig. 8 of appellant's application does not represent claim 30 and the claims dependent thereon.

Regarding iv), Ahola expressly teaches that 10% of the fibers dissolves within 4 weeks and because, Ahola did not provide a teaching where the fiber dissolution was determined in 1 hour or 1 week, or an explicit teaching of dissolution rate, it appears to be improper to assume that the rate of dissolution is linear from 1 hour to 4 weeks. It is not improper to assume that a solubility rate is inherent because appellant in section iii) acknowledges that solubility is inherent but that the rate of the dissolution may be different in view of the parameters of pore size, starting viscosity of the spinning sol and the viscosity of the sol itself. Appellant in section 3 confirms parameters of pore and starting viscosity to influence the rate of dissolution, these parameters are not in the claims.

Regarding v), it is noted that the Jokinen declaration at 10 specifically points to heat treatment of the product contributing to difference in the solubility rate of the Ahola fibers, one set heat treated and the other not heat treated. Appellant appears to be giving reasons why one fiber would be different from the other. Those differences are not in the claims to limit the silica fiber.

Regarding vi), where appellant says that integration of the fibers in the surrounding connective tissue does not represent dissolution, it is noted that appellant had not factually provided by what process the fiber of Ahola breaks down in situ to release any active agent contained within the fiber. Citation of Stedman's medical dictionary does not negate Ahola's

factual observation that "almost all the fibers had integrated well into the surrounding connective tissue."

Regarding vii), it is brought to appellant's attention that is precisely the point that applicant cannot calculate a dissolution rate of 0.0148 for the Ahola fiber from appellant's assertion that one of ordinary skill in the art has no way of calculating a dissolution rate from the disclosure of Ahola.

Regarding viii), it is noted that Example 5 is one embodiment and Ahola expressly teaches the formation of fibers and discs.

Regarding ix), claim 30 is directed to silica fiber that is spun from a silica sol, and this fiber spun from the silica sol has a solubility rate of 0.2 to 20 wt-%/hour in simulated body fluid. A factual showing is required to show that a silica fiber that is spun from a silica sol would not have the same solubility rate as the claimed silica fiber spun from silica sol. The parameters appellant pointed to that makes the claimed fiber to have different solubility rate is not in the claims. Applicant has provided opinions as to why the solubility rate of a silica fiber is different from a solubility rate of another silica fiber. Those opinions are not factual showing. The silica fiber of Ahola, which is spun from silica sol renders obvious the claimed silica fiber spun from silica sol. The fiber having surprising and unexpected solubility has not been claimed.

German '551 to GLAUBITT et al.

C: Appellant argues that cc) the biodegradability of the German '551 patent is based on the silanol content and that a 10 micron fiber dissolves completely within 50 to 500 days which is slower than the dissolution rate of 0.2 wt-%/hour. cd) The German '551 does not disclose the

time it takes for the 5 micron fiber to degrade and that theoretically, the 5 micron fiber would degrade within 25 days if one assumes a round cross-section, and while appellant says that these assumptions would be questionable, appellant says that the claimed dissolution rate would not be inherent. Appellant refers to Figure 8. ce) The German '551 leads the ordinary skilled artisan away from producing the claimed fiber and that the Patent office erroneously assumed that the solubility rate of a silica fiber is based solely on its chemical composition and that the application contains data demonstrating that silica fiber solubility can be varied by changing the point at which the fiber production begins based on viscosity of the spinning solution.

Response:

Regarding cc), it is noted that appellant's measures dissolution rate as weight percent and the point where that rate is determined is not defined as can be seen in appellant's Figure 13. Furthermore, appellant has no explicit disclosure that the dissolution rate is linear or constant or zero order and as such appellant's calculation of 21 days representing a linear dissolution rate is not supported by appellant's specification, please refer to Figure 13 in which none of the curves that represents specific viscosity show a linear/zero order relationship.

Regarding cd), it is noted that the office action mailed 2/17/07 specifically acknowledges on page 17, lines 1 and 2 that the prior art talks about dissolution rate in terms of radius per day while the claims talk in wt%/hour. The difference is in the units. But dissolution rate alone and units of dissolution is not sufficient to accord patentable distinction to a silica fiber spun from a silica sol over another silica fiber spun from a silica sol. It is within the technical expertise of the artisan to determine dissolution in radius per day or wt-% per hour as desired. Both fibers are capable of dissolving to release incorporated active agents. While the fibers as claimed are

the same, a rejection under 35 USC 103 was made in order to address the differences in units of the rate of dissolution. From the preceding arguments under the Ahola reference, appellant has indicated parameters that influence the rate of dissolution, these parameters are not in the claims. Furthermore, the claims have not specifically defined size of the fiber or has particularly excluded certain sizes and shapes, be it oval or round, so that it cannot be categorically stated that the dissolution rate of the claimed fiber is faster and the fiber of the prior art dissolves slower. Regarding Fig. 8, the viscosity parameters of the spinning sol is not claimed so that Fig. 8 of appellant's application does not represent claim 30 and the claims dependent thereon.

Regarding ce), the viscosity of the sol at which the spinning begins for the fiber production is not a limitation in the claim and limitations from the specification cannot be imported into the claims. The patent office has not erred, because silica fiber is a silica fiber and the property of the silica fiber should be what it is, property. Appellant has not claimed the features that distinguish one silica fiber over another silica fiber, both spun from silica sol.

The declaration under 37 CFR 1.132 filed 6/12/07 and resubmitted on 11/02/07 & 11/09/07 has been previously considered in the advisory action of 7/11/2007.

Supplemental declaration filed 11/02/07 & 11/09/07

The declaration under 37 CFR 1.132 filed 11/02/07 & 11/09/07 is insufficient to overcome the rejection of claims 24-33 based upon 35 USC 103 as set forth in the last Office action because: the examiner agrees with the appellant that calculation of dissolution rate based on the shape and size of the particle to arrive at 25 days for a 5 micron fiber is speculative as


appellant admits. The DE reference determined the dissolution of the fibers experimentally and theoretical calculation as attempted by appellant in the remarks and declaration cannot always translate to factual data.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

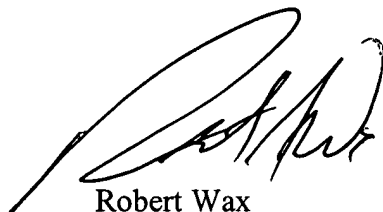
For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Blessing Fubara 

Conferees:

Michael Hartley



Robert Wax
ROBERT A. WAX
PRIMARY EXAMINER

TGAs Appeals Specialist



MICHAEL G. HARTLEY
SUPERVISORY PATENT EXAMINER